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**From:** Brasaemle, Karla [Karla.Brasaemle@TechLawInc.com]  
**Sent:** 9/8/2017 5:41:34 PM  
**To:** d'Almeida, Carolyn K. [dAlmeida.Carolyn@epa.gov]; Dan Pope [DPope@css-inc.com]; Davis, Eva [Davis.Eva@epa.gov]; Wayne Miller [Miller.Wayne@azdeq.gov]; Jennings, Eleanor [Eleanor.Jennings@parsons.com]; Eleanor Jennings [ejennings@teci.pro]; Cosler, Doug [Doug.Cosler@TechLawInc.com]  
**CC:** Fairbanks, Brianna [Fairbanks.Brianna@epa.gov]  
**Subject:** RE: Final WAFB ST012 letter 090517.docx

Hi Carolyn,

It would be better to say:

Each of the 32 treatment ovals identified for full scale EBR implementation that have no monitoring wells require at least 1 monitoring well to evaluate remedy effectiveness. In addition, one downgradient well in the UWBZ and 3 downgradient wells in the LSZ are needed to evaluate sulfate distribution after the extraction wells are turned off; these wells are needed downgradient of treatment ovals in the eastern portion of the site where extraction wells are not downgradient of the injection wells.

Karla Brasaemle, P.G.  
TechLaw, Inc.

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**From:** d'Almeida, Carolyn K. [mailto:dAlmeida.Carolyn@epa.gov]  
**Sent:** Friday, September 08, 2017 10:10 AM  
**To:** Dan Pope; Davis, Eva; Wayne Miller; Jennings, Eleanor; Eleanor Jennings; Brasaemle, Karla; Cosler, Doug  
**Cc:** Fairbanks, Brianna  
**Subject:** RE: Final WAFB ST012 letter 090517.docx

Steve sent me input on prioritization shortening the list below to 8

1. Monitoring wells not used for injection and extraction must be used as the primary source of data for determining contaminant degradation, geochemical conditions representative of the aquifer volumes, and EBR endpoints. Specifically, wells identified as "other wells" on Figures 3-2 through 3-4 of the Revised EBR Work Plan Addendum #2 must be incorporated into the monitoring program.
2. Install x number of monitoring wells in x locations to complete characterization of the groundwater plume. suggested revision:  
The 36 treatment ovals AF identified for the full scale EBR implementation require at least 1 monitoring well to evaluate remedy effectiveness in each location. (Karla -- does that cover the well request?)
3. Complete EBR baseline data from each zone must be collected, validated, analyzed, and reported prior to initiating EBR. Microbial and geochemical data collected prior to the initiation of SEE or during SEE are not considered representative of current site conditions.
4. Conduct monthly monitoring of sulfate concentrations in monitoring wells for the first 12 months after the initiation of sulfate injection and report comparisons between model predictions and measures of sulfate concentration in monitoring wells (e.g., graph the predicted sulfate concentration at each monitoring well and the field measures of sulfate as a function of time).
5. Increase COC monitoring frequency once sulfate has been injected in the subsurface (this should be included in Appendix J and an updated sampling plan).

6. Estimates for the time of remediation (TOR) must be provided for each of the three zones (CZ, UWBZ and LSZ). The revised draft final addendum did not include any supporting data or calculations to indicate sulfate reduction as designed would achieve remedial goals in the desired timeframe.
7. Conduct a field test of EBR in the UWBZ as specified in the Final Remedial Design and Remedial Action Work Plan (Amec, 2014) before completing the EBR design.
8. Develop specific (e.g., benzene concentration in LNAPL of XX at YY time after EBR implementation) milestones based on COC concentrations in the site groundwater and LNAPL; the milestones would be derived from predictive modeling of COC attenuation over time.

Carolyn d'Almeida  
Remedial Project Manager  
Federal Facilities Branch (SFD 8-1)  
US EPA Region 9  
(415) 972-3150

*"Because a waste is a terrible thing to mind..."*

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**From:** d'Almeida, Carolyn K.  
**Sent:** Thursday, September 7, 2017 3:21 PM  
**To:** 'Dan Pope' <DPope@css-inc.com>; Davis, Eva <Davis.Eva@epa.gov>; Wayne Miller <Miller.Wayne@azdeq.gov>; Jennings, Eleanor <Eleanor.Jennings@parsons.com>; Eleanor Jennings <ejennings@teci.pro>; Brasaemle, Karla <Karla.Brasaemle@TechLawInc.com>; Cosler, Doug <Doug.Cosler@TechLawInc.com>  
**Cc:** Fairbanks, Brianna <fairbanks.brianna@epa.gov>  
**Subject:** RE: Final WAFB ST012 letter 090517.docx

I've added some details to the body of the letter

Below is the list of data elements in the letter. Can someone take a stab at prioritizing them?

1. Monitoring wells not used for injection and extraction should be used as the primary source of data for determining contaminant degradation, geochemical conditions representative of the aquifer volumes, and EBR endpoints.
2. Install x number of monitoring wells in x locations so as to represent the lateral and vertical conditions at the site
3. Provide specific sampling locations to obtain concentration data in a statistically valid and defensible way
4. Develop and report formal Standard Operating Procedures before initiating EBR
5. Conduct more frequent monitoring once sulfate has been injected in the subsurface
6. Complete EBR baseline data from each zone must be collected, validated, analyzed, and reported prior to initiating EBR. Microbial and geochemical data collected prior to the initiation of SEE or during SEE are not considered representative of current site conditions.
7. The EBR Checklist that the regulatory agencies provided on June 21, 2017 will provide the basis for monitoring EBR and transitioning from EBR to MNA.
8. Conduct a field test of EBR in the UWBZ as specified in the Final Remedial Design and Remedial Action Work Plan (Amec, 2014) before completing the EBR design.
9. Conduct monthly monitoring of sulfate concentrations in monitoring wells for the first 12 months after the initiation of sulfate injection and report comparisons between model predictions and measures of sulfate concentration in monitoring wells (e.g., graph of predicted sulfate concentration at each monitoring well and the field measures of sulfate as a function of time).
10. Estimates for the time of remediation (TOR) must be provided. The revised draft final addendum did not include any supporting data or calculations to indicate sulfate reduction as designed would achieve remedial goals in the

desired timeframe. Sulfate utilization rates estimated from the push-pull test in the LSZ do not yield an estimate for the time to attain remedial goals.

11. Wells identified as "other wells" on Figures 3-2 through 3-4 of the Revised EBR Work Plan Addendum #2 must be incorporated into the monitoring program in order to provide a complete understanding of contaminant conditions and sulfate distribution within the former TTZs.
12. Develop specific (e.g., benzene concentration in LNAPL of XX at YY time after EBR implementation) milestones based on COC concentrations in the site GW and LNAPL; the milestones would be derived from **predictive** modeling of COC attenuation over time.

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**From:** Dan Pope [mailto:DPope@css-inc.com]  
**Sent:** Thursday, September 7, 2017 1:54 PM  
**To:** d'Almeida, Carolyn K. <dAlmeida.Carolyn@epa.gov>; Davis, Eva <Davis.Eva@epa.gov>; Wayne Miller <Miller.Wayne@azdeq.gov>; Jennings, Eleanor <Eleanor.Jennings@parsons.com>; Eleanor Jennings <ejennings@teci.pro>; Brasaemle, Karla <Karla.Brasaemle@TechLawInc.com>; Cosler, Doug <Doug.Cosler@TechLawInc.com>  
**Cc:** Fairbanks, Brianna <Fairbanks.Brianna@epa.gov>  
**Subject:** RE: Final WAFB ST012 letter 090517.docx

My initial thoughts.

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**From:** d'Almeida, Carolyn K. [mailto:dAlmeida.Carolyn@epa.gov]  
**Sent:** Thursday, September 07, 2017 1:35 PM  
**To:** Davis, Eva; Dan Pope; Wayne Miller; Jennings, Eleanor; Eleanor Jennings; Brasaemle, Karla; Cosler, Doug  
**Cc:** Fairbanks, Brianna  
**Subject:** RE: Final WAFB ST012 letter 090517.docx

Use this version of the letter with ADEQ's input added to add your comments

Carolyn d'Almeida  
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*"Because a waste is a terrible thing to mind..."*

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**From:** Davis, Eva  
**Sent:** Wednesday, September 6, 2017 2:25 PM  
**To:** Henning, Loren <Henning.Loren@epa.gov>; d'Almeida, Carolyn K. <dAlmeida.Carolyn@epa.gov>; Dan Pope <DPope@css-inc.com>; Wayne Miller <Miller.Wayne@azdeq.gov>; Jennings, Eleanor <Eleanor.Jennings@parsons.com>; Eleanor Jennings <ejennings@teci.pro>; Brasaemle, Karla <Karla.Brasaemle@TechLawInc.com>; Cosler, Doug <Doug.Cosler@TechLawInc.com>

**Cc:** Fairbanks, Brianna <Fairbanks.Brianna@epa.gov>

**Subject:** RE: Final WAFB ST012 letter 090517.docx

I added a couple more things – language needs to be cleaned up

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**From:** Henning, Loren

**Sent:** Tuesday, September 05, 2017 5:48 PM

**To:** d'Almeida, Carolyn K. <dAlmeida.Carolyn@epa.gov>; Davis, Eva <Davis.Eva@epa.gov>; Dan Pope <DPope@css-inc.com>; Wayne Miller <Miller.Wayne@azdeq.gov>; Jennings, Eleanor <Eleanor.Jennings@parsons.com>; Eleanor Jennings <ejennings@tedi.pro>; Brasaemle, Karla <Karla.Brasaemle@TechLawInc.com>; Cosler, Doug <Doug.Cosler@TechLawInc.com>

**Cc:** Fairbanks, Brianna <Fairbanks.Brianna@epa.gov>

**Subject:** Final WAFB ST012 letter 090517.docx

I took a stab at the kind of letter we are at the point of having to send. We can't go back and forth about what hasn't been addressed from our comments. If we (the regulatory Agencies) are going to approve the AF implementing EBR then there are some things they must do to receive our approval. I pieced together a few items from Dan's email and Carolyn's email. Please edit by adding specific and vitally necessary requirements within the next three years that the AF must do. If they do not agree, we go to dispute.

It would be great to have this letter mostly drafted and a briefing drafted by Thursday. We will likely need a couple more weeks to get back to the AF on the review of the document, Carolyn, you should talk to Cathy and see if that will be an issue. I think we're supposed to formally respond by this Friday.

Loren

Loren Henning, Acting Chief  
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US EPA Region 9  
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